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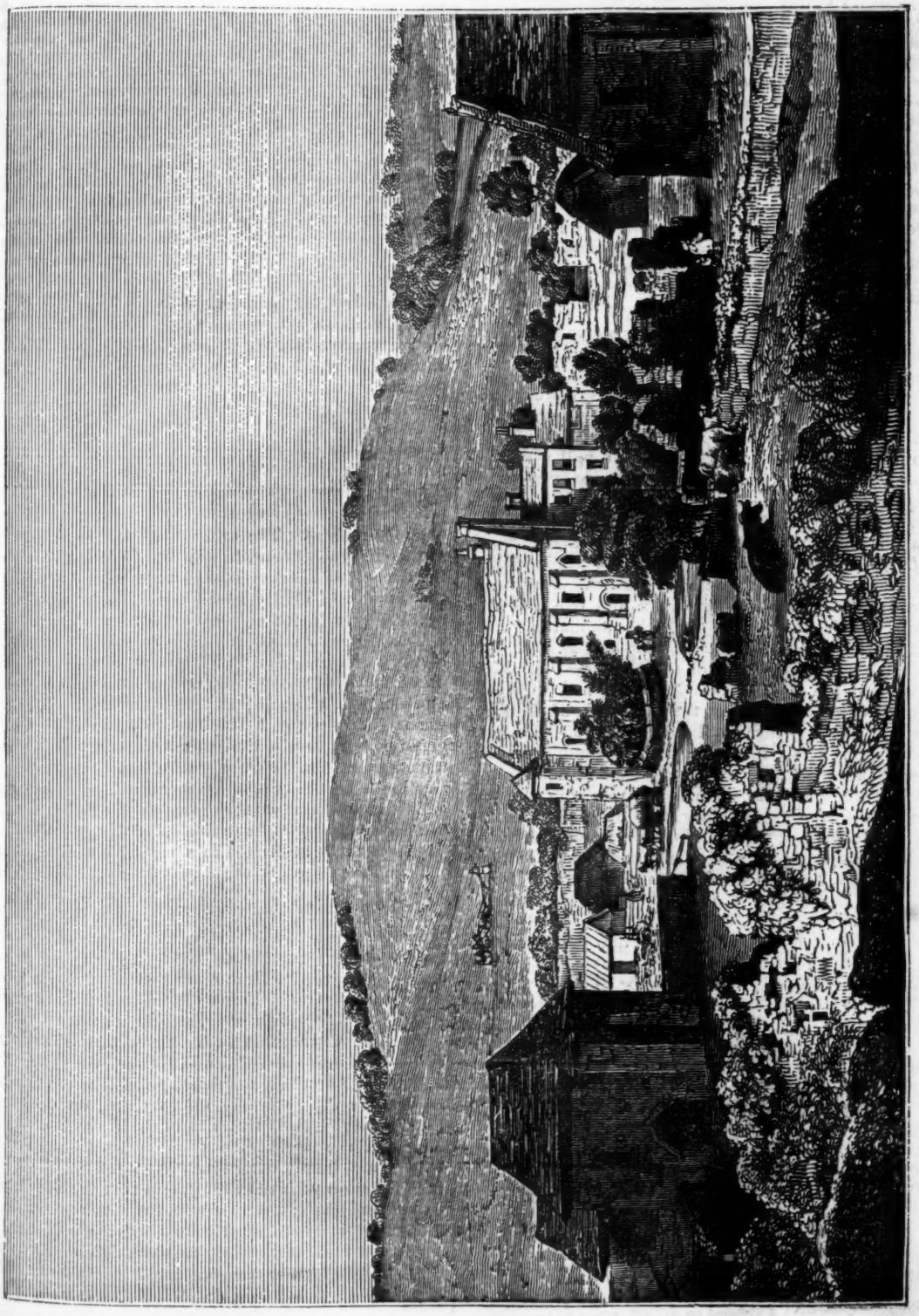

DOVER PRIORY, KENT.

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BY referring to some previous numbers of the *Saturday Magazine**, the reader will find much information respecting various parts of Dover and its vicinity. We propose, on the present occasion, to give an account of the ancient PRIORY at Dover, part of which still remains as a record of by-gone times.

The history of this religious institution carries us back to times anterior to the Norman conquest. Ancient chronicles inform us that Withred, king of Kent, built a church and several other edifices in the town of Dover, for the accommodation of twenty-two secular† canons, whom he removed from the castle. To the canons of this church, which received the name of St. Martin's church, was granted the privilege of exemption from the jurisdiction of any persons except the kings of England and the pope. This privilege, together with grants of land which they received, gave the canons considerable power, which excited the jealousy of many of the Kentish barons; for, as early as the time of Harold, two of their manors were seized by Alnod, the thane of the district.

When William of Normandy conquered England, the estates of the canons of St. Martin were surveyed and valued, and they yielded a revenue of 48*l.* 6*s.* 4*d.*, the lands being held in common by the prebendaries. The sum here mentioned was a large one in those days.

With regard to others of their possessions, it is recorded that one Ralph Columbels had taken from them a pasture, Robert of Romney a salt-work, and a fishery worth *twenty pence* yearly. Hubert, the son of Ino, gave to the bishop of Bayeux a mark of gold, to permit him to take possession of a mill which belonged to the canons, and he held it, contrary to all right. Lambart also took from them one mill, Woodward another, and Ralph Curbspine a third. The canons had three churches in the town, worth 1*l.* 10*s.* 8*d.*, a garden and a pasture at Medredive, valued at 9*s.* 4*d.*, and another at Sibbertswould, worth 1*s.* 4*s.* They also had ten mills and one half of a mill, worth about 12*l.*, and the annual payment which they made to the archbishop was 2*l.* 15*s.*

Such was the position of the canons of St. Martin about the time of the Conquest, and they continued uninterruptedly in the possession of their revenues and influence until the year 1132. For some time previous to this date various complaints had been made from different quarters against the canons. Being answerable to no one but the king and the pope for their conduct, they were accused of having often overstepped the bounds of decorum, both in the internal arrangements of their house, and in their intercourse with the inhabitants of Dover. William Corbois, archbishop of Canterbury, having no sort of control over them, complained to Henry the First of their conduct, and boldly said that the king must be responsible for the faults of the canons, if he did not delegate to some one the power to check them.

These complaints were repeated year after year, the canons being accused of gallantry, worldly pursuits, dissipation, and wasting their revenue in extravagant luxuries. In their defence, it has been said by Mr. Lyon, in his *History of Dover*,—

> Many of the religious societies were at that time frequently put to heavy expenses, by the nobility, gentry, and others, who visited them, when travelling either on business or pleasure, and they expected that the ecclesiastics would treat them hospitably. As they were situated in a town through which there were many passing to and from the Continent, they were obliged frequently to receive visitors, and to spend large sums in entertaining them. The religious orders in the time of Edward the First found that having so many persons to accommodate was such a heavy burden, that their income was insufficient to support their expenses, and to use hospitality to the poor.

However, extravagant expenditure being one of the many charges brought against the canons of Dover, a formal complaint was made by the archbishop, in the presence of the king, queen, and many of the nobility, at Canterbury; and the prior and brethren of the priory of Christchurch at Canterbury joining in the complaint, they succeeded in having the revenues of the canons made over to them, so that the order at Dover became the property of Christchurch.

The archbishop thereupon laid the foundation of a new building in the fields, not far from the town, in the year 1132, and he had the work carried on with such expedition, that it was finished in four years, with all its extensive buildings. This new building he called DOVER PRIORY.

The archbishop had himself been one of the canons of Dover, and he proposed placing the canons of Morton in his new priory, with permission for them to elect a superior out of their own body. From this period there ensued a succession of violent and discreditable proceedings, since there were three parties who conceived they had a right to the revenues of the priory, viz., the canons who had been displaced for alleged misconduct, the prior and brethren of Christchurch priory, Canterbury, to whom the king had granted the said revenues, and the canons of Morton, to whom the archbishop had granted them.

The archbishop commissioned two bishops to consecrate the new priory, and sent the canons of Morton to take possession; but the monks of Christchurch thinking themselves wronged by this arrangement, protested against, and threatened to appeal to the pope for redress. The archbishop was so chagrined at this disappointment, that he fell ill and died; and the canons of Morton having thus lost their patron, the monks of Christchurch took possession of the new Priory, without waiting for its consecration.

The former canons, finding themselves deprived of their revenues, first by one party, and then by the other, appealed to the king, the bishop of Winchester, and the pope's nuncio; the result of which was, that the monks were compelled to quit the Priory, and give up possession to the original canons. These retained possession for a few years; but when Theobald was made archbishop of Canterbury, he gained the good-will of the monks by giving them possession of the priory again, to the exclusion of the poor canons. This grant was confirmed in a formal manner by the king and the pope, and the monks took the order of the Benedictines, in obedience to the wish of their patron Theobald. But here again was a new source of discord: the new settlers at the Priory, who were a section of the monks of Christchurch, claimed the privilege of choosing their prior from among themselves; whilst the monks of Christchurch wished to choose a prior from among *their* own body, at Canterbury.

At last, after repeated contests throughout the reigns of Henry the Third and Edward the First, the monks of Canterbury petitioned Archbishop Peckham to give the Priory wholly up to them, on the plea that it was rightfully theirs from the beginning. The king and the archbishop together investigated the matter, and finally determined that the monks had nothing to do with the Priory, and that the Benedictines should be allowed to choose their own prior.

This privilege remained untouched for half a century; but there happening, in the reign of Edward the Third, to be a vacancy of some length in the occupation of the see of Canterbury, the monks of

* See *Saturday Magazine*, vols. iii., p. 154—v., 132—x., 112, 138.

† The term *secular* here implies that the canons were not bound by monastic rules.

Christchurch seized the opportunity to renew their old claim, and the Benedictines found themselves under the necessity of defending their rights. Under the plea that, as there was then no archbishop, the monks had ecclesiastical authority in the diocese, they commanded the Benedictines to swear fealty to them. This the latter refused, and sent one John Stokes to Canterbury, in 1348, to defend them in their refusal. After much contention the monks gained the day, and Edward the Third annexed the Priory of Dover to that of Canterbury.

This, then, is a brief account of the extraordinary contests for the Priory of Dover, which continued for upwards of two hundred years; and the whole furnishes us with a view of the violent and rapacious tone of behaviour which distinguished those periods of English history. The Priory of Dover, after its annexation to that of Canterbury, "continued," says Mr. Lyon, "under the control of that society, until the general dissolution of monasteries; and they ruled it with an iron hand."

The surrender here alluded to was the general breaking-up of all monastic establishments in England, in the reign of Henry the Eighth. That monarch sent commissioners to estimate the value of all monasteries, priories, nunneries, &c., which, with but little regard to justice or compassion, he seized for the use of himself or his favourites. Dover Priory shared the same fate as the rest. The commissioners took possession of the Priory, Nov. 17th, 1536, sold enough of the effects to pay the debts of the Priory, and sent all the rest to the Tower of London. The king gave the Priory, with the lands, tithes, and buildings belonging to it, first to the Bishop of Dover, and afterwards to the Archbishop of Canterbury, to which see they have belonged, we believe, ever since. The annual income of the Priory, at the period of its dissolution, was 232*l.* 1*s.* 5½*d.*

The ruins which are still remaining of this Priory are of considerable extent, and are surrounded by a stone wall. The exterior structure of the Refectory, which is more than a hundred feet long, and still entire, has been converted into a barn. The gateway is also in tolerable preservation: part of the church or chapel still remains, and a farm-house, rebuilt not many years ago, stands among the ruins.

MECHANICAL POWERS. III.*

2. The Wheel and Axle.

All forms of the lever described before, have this disadvantage, that the weight can only be moved through a very small distance without great inconvenience. Suppose, for instance, it were required to move a resistance of 100 lbs. through a space of one foot by a power of one pound; that power must move through a space of 100 feet, by whatever machine we effect it, but it will be much more convenient to make fifty strokes with the arm, each two feet long, or describe fifty circles, each two feet in circumference, than to make one great stroke of 100 feet, or move the arm once round a circle of 100 feet in circumference. It is in order to make the motion of the power more easy and convenient, that that most useful and elegant contrivance, the Wheel and Axle, is so extensively employed. It is nothing more than a peculiarly shaped lever, and acts on the principle explained in the first of these papers; viz., *that when two bodies revolve in equal times round the same centre, that which is farthest from the centre moves with the greatest velocity.* Thus the inhabitants of tropical countries are carried round by the earth's daily rotation more rapidly than we are, because they are farther from the earth's axis.

A wheel used in machinery differs from those employed for facilitating the motion of carriages, in this,—that it is fixed firmly on its axle, so as to form as it were one instrument; whereas the wheels of carriages are allowed to run loosely on their axles. It is of the former kind of wheel only that we are now about to speak: of course, such a wheel cannot be turned without also turning its axle, nor can the axle be turned without turning the wheel. Now any force applied at the circumference of such a wheel must possess greater velocity, and therefore greater momentum, than a similar force applied to turn the axle. Try to turn round any wheel (as the fly-wheel of a roasting-jack) by applying your hand to the circumference, or outer edge, having previously placed a heavy weight on the wheel, and you will find it very easy to turn it. But now, letting the weight remain in its former place, try to turn the axle, and you will find it more difficult to do so. The reason of this will appear more evident by considering that in both cases you move your hand with the same velocity; for instance,—an inch in a second. Now, suppose the circumference of the axle to be two inches, and that of the wheel forty inches: if you move the axle round at the rate of an inch in a second, it will revolve once in two seconds; and the whole wheel will revolve with it in the same time; so that the circumference of the wheel must of course move at the rate of twenty inches in a second. But when you turn the wheel by applying your hand to the circumference, if you still move your hand at the same rate as before, the rim or circumference will only move with a velocity of one inch in a second; and no wonder then that it is more easy to turn it at this rate than at that of twenty inches per second! But, if it were required in both cases to move the wheel with the same velocity, you would find it no easier to do so by applying your hand at one part than at the other. Thus, you will find it as difficult to move your hand round the circumference, at the rate of twenty inches per second, as round the axle at one inch per second: for *to move the same weight with the same velocity, the same power is always required.*

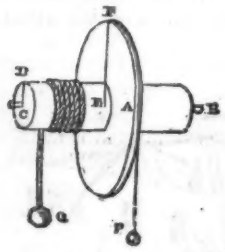
The most simple method of applying the power of gravity to turn a cylindrical body, is by winding a rope or string round the cylinder, and hanging a weight to the bottom of the rope. The gravity, or downward tendency, of this weight causes the string to unwind itself, and in so doing to drag round the cylinder, which continues to revolve as the weight descends, till all the string is unwound, or the weight meets with some obstacle on which to rest. The wheels of a roasting-jack, and those of a clock, are both moved in this manner. Now, suppose the same cylinder (or *barrel*, as it is technically termed) to have two cords wound on it in opposite directions, each having a weight, so that one weight tries to pull the barrel round in one direction, while the other pulls in a contrary direction. If the two weights be equal they will of course counteract each other, and no effect will ensue; that is, they will be *balanced.* But, if they be unequal, the heavier will preponderate, and drag the barrel round; but the same motion which unwinds this cord will wind up the other; and thus while the heavier weight descends, the other will ascend, not as in the lever, through only a small space, but they will continue to move as long as the length of the cords will allow. But this only holds good as long as the two parts of the cylinder on

* This article has been accidently misplaced: it should have appeared before No. IV., already printed at page 92.

which the two cords are wound are of equal size. If one part of the cylinder be larger than the other, two equal weights no longer balance each other; but that which is wound on the larger part of the cylinder will preponderate.

Now a wheel and its axle may evidently be considered as two cylinders of very unequal sizes, fixed together, so that they must revolve together in the same time. If, therefore, one weight be hung to a string wound round the rim of the wheel, and another weight be attached to a string wound round the axle in a contrary direction to the former, it will require the latter weight to be much heavier than the former in order to balance it. If, for instance, the diameter of the wheel be twelve feet, and that of the axle one foot, it will require a weight of twelve pounds on the axle to balance one pound on the wheel, and if the power applied to turn the wheel exceed one pound, it will raise a weight, or overcome a resistance, of twelve pounds acting on the axle. Thus there is a great gain of power. The reason of this is, that there is a similar loss of velocity. The circumference of the wheel is about thirty-six feet, while that of the axle is only about three feet; therefore, any part of the rim of the wheel, or any weight attached to it, moves through a space of thirty-six feet, while a weight attached to the axle moves in the very same time through a space of only three feet. The gain of power may thus be accounted for, by considering the wheel and axle as a lever of the first kind; thus in the following figure the line A E or F E may be considered as a lever having its fulcrum at E; the power P, applied at the end A, and the resistance Q, acting at D, when, of course, the power P must bear the same ratio to Q that the smaller arm of the lever A E does to the larger arm; the former of which is the radius of the axle C B, and the latter that of the wheel.

Fig. 9.



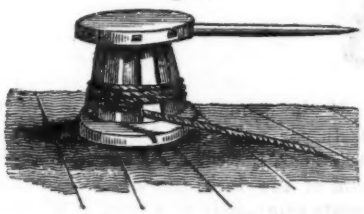
Thus we see that the whole of the wheel is not necessary, when the power of the hand is applied. In that case, there need only be a bar or lever A E projecting from the axle, and having the power applied to the end of it. This is the case in the windlass and capstan, two very useful machines for raising or moving great weights.

The construction of the common windlass for drawing up a bucket out of a well is too well known to need description here. But the reader will observe that it acts on the principle of the wheel and axle, and that the power gained is in proportion as the motion of the hand is quicker than that of the bucket; or in proportion as the circle described by the hand is larger than that described by the rope, as it winds itself on the barrel. Hence, the longer the winch is, and the smaller the barrel, the less exertion will be required in drawing the water. But the circle described by the hand cannot conveniently be made to exceed two feet in diameter, or about six feet in circumference. Now, suppose the diameter of the barrel to be three inches, its circumference will be about nine inches, or one-eighth of the circle described by the hand. While, therefore, the hand moves through eight feet or yards, the bucket will only be drawn up one foot or yard; and in order to draw the bucket up a well twenty feet deep, the hand must move through 160 feet. But this loss of velocity is made up by a corresponding gain of power; for, in order to raise a bucket weighing eighty pounds, the power exerted by the hand need not exceed ten pounds. These remarks apply also to all other mechanical operations in which a winch is used, as in winding up a clock or jack.

Fig. 10.

The capstan is a machine used principally in naval operations, as in weighing anchor. It is represented in the following figure, and consists of a kind of windlass placed vertically, instead of horizontally.

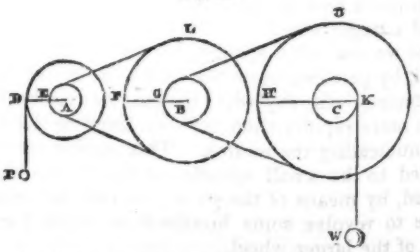
Fig. 11.



The head of the capstan has a number of holes through which long poles can be inserted, (only one is inserted in the figure) and each of these poles can be pushed round by several persons walking behind it. The great advantage of the capstan is that several men can work at it at once. Thus the most usual number of poles is eight, and each of these is seldom shorter than to accommodate five persons; thus forty men can all work together at one moderate-sized capstan.

Sometimes, when it is desirable to increase velocity at the expense of power, the power is applied to the axle of a wheel in order to turn it. This is the case in the contrivance called the *crank*, which is almost always used in all kinds of steam-engines. In order to increase velocity one wheel is made to act on the axle of another, and the circumference of that on the axle of the next, and so on. Such a combination is called *a train of multiplying wheels*; and by them any degree of velocity may be produced, provided the original moving power be sufficiently large to sustain so great a diminution. This is effected in two methods.

Fig. 12.



In the first of these figures, the rim of the wheel O is made to act on the axle of the wheel L, by an endless band passing round them; so that the circum-

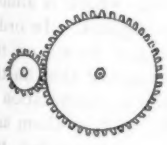
ference of the axle B revolves with exactly the same velocity as that of its driving wheel O. The circumference L must therefore revolve much more quickly than O, because it makes one revolution in the same time that B does round the same centre. In this manner the wheel D must move still more rapidly than either of the others. In this combination, the force of P is to the force exerted on the band E L, as the radius of the axle A E to the radius of the wheel A D. The force of E L is to the force of G O, as B G is to B F; and the force of G O is to the force at K, or the weight W, as C K to C H. Hence the power P is to the weight W, as the radii of all the axles multiplied together to the radii of all the wheels multiplied together. If the radii of the axles be, for instance, 1, 2, 3 inches, and of the wheels, 3, 6, 9 inches, respectively; then the power P is to the weight W, as $1\times2\times3=6$ is to $3\times6\times9=162$; or as 1 to 27.

Fig. 13.

In fig. 13 the same end is obtained by the wheels having teeth, or cogs, fitting into one another so that one cannot turn without turning the rest. The mechanism of the clock, the watch, and the roasting-jack, consists principally of a train of wheels like this: but, when great power is required, the order is reversed; the axle of each wheel acting on the rim of the next, so that the velocity is greatly diminished, but the power increased. This is the case with jacks and cranes used for hoisting great weights. In all these cases the smaller wheels are called *pinions*, the larger only retaining the name of *wheels*.

When one wheel acts upon another by teeth, in order to preserve uniformity of motion, the teeth must be so cut that they may go smoothly between one another; so that the proportion between the power and weight shall not be altered as the wheels revolve.

Fig. 14.



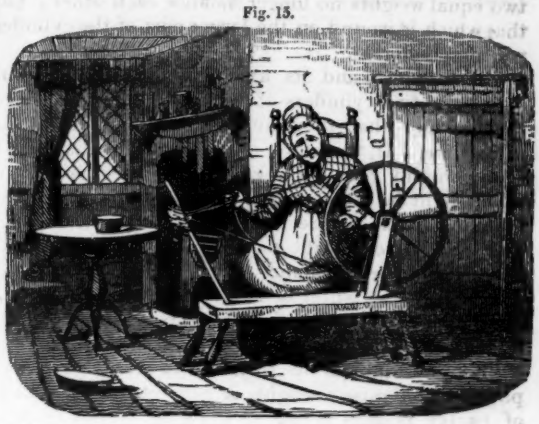
In these wheels, the number of revolutions which a wheel connected with another will make, for one revolution of the first wheel, will be known, if the number of teeth be known. Thus, if the large wheel contain 48 teeth, and the small one 16, the latter will revolve three times as fast as the former; which is constantly exemplified in clock-work.

In the common spinning-wheel, a very rapid motion is given to a spindle, by means of a strap passing round a larger wheel.

The woman who spins gives motion to the large wheel, by pressing upon the spokes of the wheel near the centre; whereby she makes its circumference move more rapidly than her own hand at the time of communicating the motion. This motion is communicated to the small spindle on which the thread is wound, by means of the strap; so that the spindle is made to revolve some hundreds of times for every turn of the larger wheel.

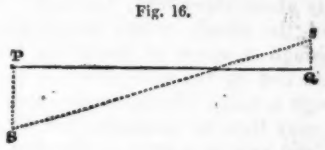
Now, in order that the machinery of the wheel and axle may be useful *in doing work*, the power and weight must no longer correspond, as at figs. 9, 12, and 13. Let us, bearing in mind the action of the common lever, suppose that P descends through the space P s,

Fig. 15.



and that, in consequence, the weight Q is raised through the space Q*s*. Here it is manifest that P and Q are not balanced horizontally; but they will be

Fig. 16.



balanced in the line s *s*, if P, multiplied by the spac P s, be equal to Q, multiplied by the space Q *s*. The space Q *s* is to the space P s, with the wheel and axle, as the radius of the axle to the radius of the wheel.

Fig. 17.

The pressure, multiplied by the space which it passes through, is the *measure of the power of a machine*. Thus, suppose a man, whose weight is 160 lbs., goes up a ladder, 30 feet high, and descends in a bucket, as in the cut below; the force by which he does this, measured in pounds and feet, is $160\times30=4800$; and this force may be caused, as has been before shown, to raise a weight (for instance) of 10 lbs. through a space of 480 feet; or a weight of 480 lbs through a space of 10 feet.

THE following is a negro's definition of a gentleman. "Massa make de black man workee—make de horse workee—make de ox workee—make ebery ting workee, only de hog—he no workee; he eat, he drink, he walk 'bout, he go to sleep when he please, he liff like a gentleman."—*West India Paper.*

SEAT OF WAR IN THE EAST.

No. III.

THE AFGHANS, BELOCHEES, &c.—CAUSE OF HOSTILITIES.

The *inhabitants of Afghanistan* are formed into two great divisions,—those who live in tents and those who reside in houses; the former occupying one half of the western portion of the country. The chief characteristic of the Afghans is an attachment to pastoral life: those who remain in towns being mostly held in disdain by the nomades;—the towns-people are principally *Tavjiks*, supposed to be the original tribe who were subdued by the Afghans, and are believed to amount to 1,500,000 in number.

The manners of the Afghans are frank, and their hospitality is so unbounded, that it is said a stranger might travel from one end of the country to the other without money. Robberies are, however, frequent among the ruder tribes, though never acccompanied with murder.

The qualities of the Afghan people have been summed up as thus: they are faithful, brave, hospitable, frugal, prudent and laborious, but they are also revengeful, envious, rapacious and obstinate. Though the Afghans are Mohammedans, they are tolerant; for Hindoos and Christians live peaceably and are respected among them. Their language is called Pushtoo, about one half of the words are Persian, the rest of an unknown origin.

Education is not neglected; there are schools in every village, which is usually attended by a priest. Some boys are sent entirely away from their parents to live in a mosque. The most celebrated university is at Peshawar.

The form of *Government* in Afghanistan is that of a limited monarchy:—each tribe has, beside a supreme head or *Khan*, a *jeerga* or representative-assembly, without whose concurrence, the Khan can undertake nothing. The tribes form separate states, and often make war upon each other. The regular and disciplined army of Afghanistan is about 13,000 strong: beside a militia of 12,000 men, each fighting under the banners of their chieftain.

A *history* of such a people as the Afghans would be nothing more than a record of petty warfare carried on between rival tribes for disputed territories. Some events of a late date, we shall, however, presently state, as necessary to convey a proper understanding of the present position of affairs.

Beloochistan is governed by an independent chief, whose subjects have been described as brave, hospitable, but "honorable" robbers, who make *chepaos* or raids of eighty or ninety miles to burn villages and carry off the inhabitants as slaves; but whoever claims or purchases their protection is treated kindly and secured from harm. Conjoined with the Belochees, are the Brahoves, who are supposed to be the aborigines of Beloochistan, and are mild, innocent and pastoral, occupying little villages, situated on the bosoms of the mountains; while the people of the Leia province, are described as caring neither for "King, Khan, God, nor the Prophet," being pre-eminent for their rapacious and predatory habits: but keep their faith when they pledge it. One English traveller, having secured the friendship of their chief, was assured that, "while under such protection he need fear nothing mortal." The province Mekran is infested by banditti, called *Loories*, who have renounced every religious belief, and are of a more base and brutal character than the most abandoned Asiatic hordes; they not only plunder and murder without scruple, but are guilty of every species of depravity.

The *Ameers*, who chiefly inhabit the Sinde, are so exceedingly fond of hunting, that they have laid much of the country waste, or converted it into jungles. They have a great desire for the acquisition of jewels and arms, and their collection of musquets and sabres, ornamented with gems, is supposed to be the most extensive in the world. They are intolerant Mohammedans, and persecute with relentless malignity all who profess the Hindoo religion.

Punjàb is inhabited by a powerful religious sect, Seiks, under Runjeet Singh. The rude habits of these people are described as unfavourable to commerce and prosperity; but their degraded state is more to be attributed to repeated incursions of the Afghans and Persians, than to rooted evil habits; for having sought the protecting influence of the British Government, their social state is rapidly improving. They have, in many instances, adopted the European methods of farming, and are truly alive to the advantages of intercourse with civilized countries.

In 1832 the Governor-general of India concluded a treaty, which had for its object the navigation of the Indus by British merchants, to which Runjeet Singh, the Nawab, and the Ameers of the Sinde, were parties. Continued disturbances have, however, as yet defeated in a great measure the objects of this excellent treaty.

To afford an insight into the causes which have given rise to the present hostilities, we must return to the Afghans, and mention a few facts illustrative of the position in which they stand in relation to the Persian and British interests.

In 1809 Shah Soojah governed Cabùl, but was deposed by its former ruler, Mohammed, and obtained an honourable asylum in the British Indian territory. Mohammed was reinstated on the throne, principally by the influence of a powerful chief, named Kutteh Khan, who was appointed Grand Vizier. The king's son, Kamraun, having obtained the government of the province of Kandahar, became jealous of the influence of the vizier, and, contriving to get Kutteh Khan into his power, put the unfortunate chief's eyes out, and he was ultimately murdered by order of Mohammed.

This act of cruelty so enraged the Baurrickzyees, a most powerful tribe, that they deposed Mohammed, who, with his son Kamraun, flew to Herat, and the territory of Cabùl was shared amongst the brothers of the deceased vizier.

The kingdom of Cabùl is at present under the sway of the cleverest and boldest of these brothers, Dost Mohammed Khan. Mohammed, whom his tribe deposed, died of a broken heart at Herat, and his son Kamraun it is who made such a brave and successful defence of Herat, which the Persians attempted in vain to recover; as the first step it was conjectured towards marching to the frontiers of British India.

It is proposed by the English government in India to replace Shah Soojah (who still is under British protection) on the throne of Cabùl by force of arms, as a prince, who from gratitude would rather further than oppose our interests, which are in danger from the intrigues of the Persian court, aided, it is supposed, by a powerful ally.

IT is very true that precepts are useful, but practice and imitation go far beyond them; hence the importance of watching early habits, that they may be free from what is objectionable; and of keeping before our mind, as much as possible, the necessity of imitating the good and the wise; without settled principle and practical virtue, life is a desert; without Christian piety, the contemplation of the grave is terrible.—SIR WILLIAM KNIGHTON.

ON ARROW-ROOT AND SALEP.

THESE are two vegetable productions which are much valued on account of the large amount of nutritious matter which they contain within a given bulk.

Arrow-root is a kind of starch, manufactured from the root of a plant, the *Maranta arundinacea*, which is cultivated in gardens, both in the East and West Indies. The tree is an herbaceous perennial, and is propagated by parting the roots. Its height is from two to three feet; the leaves are broad and pointed; the tree bears small white flowers, in clusters, and globular fruit, of the size of currants. It is much cultivated, both for domestic use, and for exportation, in the countries which we have named. The term *arrow-root* is in some respects misapplied to this plant. The Indians used to employ the root of the *Alpinia galanga* for extracting the virus communicated by poisoned arrows, and it used to be supposed that that was the same plant which yields the substance known by us under the name of arrow-root; but the plants are now known to be different.

The arrow-root of commerce is prepared from the maranta, in the following manner: the roots, when about a year old, are dug up, and well washed, and beaten in deep wooden mortars, until they are reduced to a milky pulp. Instead of being beaten, they are sometimes grated. This pulp is then thrown into a large portion of clear water, and after the whole has been agitated for some time, the fibrous parts which are found among it are carefully separated, squeezed, and thrown away. The pulp, or milky liquor which remains, is a mixture of a kind of starch with water, and is strained through a hair sieve or coarse cloth, to separate the fibrous portions which may still remain mixed with it: it is then suffered to stand for some time, till the starch has settled at the bottom. The water is then drawn off, and the white pasty mass remaining at the bottom is again washed in a separate portion of water, and allowed to subside as before. This process is sometimes repeated three, or even more times, if it be wished to prepare the powder exceedingly fine. When the pulp is considered to be sufficiently cleansed, the water is entirely drained off, and the pulp is dried on clean white cloths in the sun. It then forms an extremely pure starch, which, when reduced to powder, is the *arrow-root* of commerce. It is at once fit for consumption, and will keep for a very considerable length of time.

M. Poiret, in the *Dictionnaire des Sciences Naturelles*, thus speaks of arrow-root:—

This species of the maranta was brought from the East Indies to Jamaica, more than half a century ago, by an English captain. It was at first cultivated as a curiosity, and as a remedy for the wounds made by the poisoned arrows of the savages. This property has been questioned; but other valuable qualities, the existence of which does not admit of doubt, have induced the planters of Jamaica to make a mercantile speculation of its culture. Very considerable plantations of it exist. When the stalks are dried, the roots, or rather the shoots or suckers, are cut off, which are sometimes more than a foot long, and an inch or an inch and a half in diameter. These shoots, when boiled and seasoned, are very wholesome, in the same way as other similar roots. But the most important use of them is for the preparation of an abundant, wholesome, and nourishing starch, or fecula. This forms one of the most agreeable kinds of food for children. A kind of cream is also made of this starch, to which sugar and aromatics are added: besides being agreeable to the taste, it is nutritious for the stomach. English physicians, even at London, order this fecula to be taken by their patients, where they would, in other cases, order sago. It constitutes an important article of commerce between Jamaica and London, and the cultivation of the plant is increasing.

Mr. Macculloch informs us that the arrow-root entered for home consumption has lately amounted to the large quantity of 450,000 lbs. a year.

Salep.—We must now direct our attention to the other of the two articles named at the head of this paper, and which bears many points of resemblance to arrow-root.

Salep is derived from the *Orchis mascula*, a plant much cultivated in the East, for the sake of its root, which forms a considerable portion of the diet of the inhabitants of Turkey, Syria, and Persia. There are many different species of the orchis; but it is from that called the *mascula* that the starchy substance called *salep* is prepared.

The *Orchis mascula* consists of a root, composed of two fleshy lobes, crowned with oblong, broad, spotted leaves, and having upright stalks, growing to the height of twelve inches, furnished with one or two narrow leaves, and terminated by a long spike of reddish-purple flowers, which exhale a very slight agreeable odour: these commonly appear in the months of May, June, and July. The soil best adapted to its growth is dry and not very fertile: in rich or highly-manured land, it does not arrive at maturity; for where the experiment has been tried, the roots of the few plants that did appear proved black, and were half-rotted in the ground. The stem is sent up by the lobe of a former year, and the new lobe, which is therefore easily distinguishable from the old one, is formed in the course of the summer as the tubers of potatoes. The root is known to be fully matured, when the leaves and stalk begin to decay. The plants may then be dug up, and the new lobes—from which alone salep is made—separated from the others.

The process of preparing salep, according to Mr. Moult, is as follows. The roots of the orchis are gathered at the time when the seed is formed, and the stalk ready to fall; because the new bulb, of which the salep is made, is then arrived at its full maturity, and may be distinguished from the old one by a white bud arising from the top of it, which is the germ of the orchis of the succeeding year. The new root is to be washed in water, and the fine brown skin which covers it is to be separated by means of a small brush, or by dipping the root in hot water, and rubbing it with a coarse linen cloth. When a sufficient number of roots have been thus cleaned, they are to be spread on a tin plate, and placed in an oven, heated to the usual degree for baking bread, where they are to remain six or ten minutes, in which time they will have lost their milky whiteness, and acquired a transparency like horn, without any diminution of bulk. In this state they are to be removed, to dry and harden in the air, which will require several days; or by using a very gentle heat, this operation may be finished in a few hours. Mr. Moult observes that salep, thus prepared, has a quantity of thickening water, which is to that of fine flour, nearly as two and a half to one, with this difference that the jelly of salep powder is clear and transparent, whereas that of flour is turbid and white.

Salep is brought to England in oval pieces, of a yellowish white colour, somewhat clear and pellucid, very hard and almost horny, of little or no smell, and in taste something like gum tragacanth. All that is required, to adapt the salep to food, is to boil it in water to the required consistency.

Salep is said to contain a greater quantity of nutriment in a given bulk than any other vegetable substance. The powder of it has been therefore proposed to constitute part of the provisions of a ship's company at sea. The powder, and *portable soup*, or the dried gelatinous part of flesh, dissolved together in boiling water, form a rich thick jelly. Indeed it

has been asserted that an ounce of each, boiled in two quarts of water, will be sufficient subsistence for a man per day.

Dr. Percival has adduced proof that salep may be used as an economical ingredient in bread. He dissolved one ounce of the powder in boiling water, and mixed the mucilage with a sufficient quantity of flour, salt, and yeast, viz., two pounds of flour, two ounces of yeast, and eighty grains of salt. The loaf, when baked, was remarkably well fermented, and weighed three pounds two ounces.

M. Geoffroy formed an opinion that the European *orchis* would yield nearly as good salep as that of India, which he found to be correct. He chose the largest and fullest roots he could find: these he nicely skinned, taking off the whole outer rind; then throwing them into cold water he suffered them to macerate there some time: after this he slightly boiled them; and taking them out of the water, and draining them, he had them strung upon threads, to be dried in a warm and dry air. When the roots were thoroughly dried, they were very transparent, and resembled pieces of gum tragacanth, and continued dry and hard. The roots, thus prepared, may be kept long in a dry place, and will never attract humidity, or become mouldy and rotten. The root, thus prepared, may be reduced to powder, and dissolved in boiling water, in the same manner as the oriental salep, and will be nearly equal to it in every respect.

As an article both of diet and medicine, salep has been spoken of highly. The Arabian physicians prescribe it with great confidence in consumption. The Indian practitioners believe salep to be a powerful strengthener of the body, and prescribe it in conjunction with mastic and some other ingredients, in cases requiring tonics. The restorative, mucilaginous, and demulcent qualities of salep, render it, in the opinion of Dr. Percival, of considerable use in various diseases. In the sea-scurvy it assuages the acrimony of the fluids, and is easily assimilated into a mild and nutritious chyle. In diarrhœa and dysentery it is highly serviceable, as it is also in what is called the symptomatic fever.

It does not appear that salep is much employed in this country at the present day, as an article of diet, notwithstanding the favourable opinion which medical men in general express of it.

He that hath a trade, hath an estate, and he that hath a calling, hath an office of profit and honour: but then the trade must be worked at, and the calling well followed, or neither the estate nor the office will enable us to pay our taxes.—Franklin.

Chemists inform us that the union of the particles of which matter is composed, is owing entirely to what, in that science, is called affinity. For instance, in dyeing, without an affinity between the substance to be dyed and the colouring material, the dye *will not take*. There is an analogy to this theory in the moral world. "Evil communications corrupt good manners." They do so, because a latent principle of evil is often drawn out by the presence of a kindred quality in another. If this be correct, the maxim is susceptible of some qualification; for where the supposed affinities are not found, there will be repulsion instead of cohesion, and the virtuous will escape contamination. It is pleasant also to reflect that this theory includes the converse maxim, viz., "that good communications purify evil manners:" and coupled with the belief that there is no nature wholly destitute of some redeeming qualities, which favourable circumstances may draw out and strengthen, hope may be entertained for all: and they who really believe in the attracting beauty, as well as in the varied and inherent excellence of the goodness they commend, may find great encouragement to continue their efforts to extend the possession of the qualities they reverence.

ATMOSPHERIC AIR.—THE BAROMETER.

Nature does not, perhaps, furnish us with a more perfect instance of her economy than is to be found in the atmospheric air. This wonderful medium, which in ordinary circumstances is appreciable by none of our senses, is one of the mightiest agents in contributing to the beauty and utility of the globe, on whose surface we dwell. Yet it requires the aid of science and reflection, to be convinced that the atmosphere is everywhere present, and that its powers are so energetic. We cannot judge of its presence by sight, except when a certain amount of vapour uniformly suspended in it, affords us the view of the blue sky, or the distant blue-clad mountains. It does not appeal to our sense of smell, save when it wafts the sweet perfume from the rich lap of variegated earth. We feel it, only when it is in motion, "breathing refreshment on a fainting world." It refers in no way to our sense of taste; and we hear it only when another body, put into rapid motion, communicates motion to it also, and this again to our ear. And yet, deprived of air, no animal, no vegetable, could exist; no flame could burn; no sound could be heard; no light could be seen. Darkness would again move upon the face of the waters, as at the time before the Creator had excited into action the powers with which He had caused organic nature to be endowed.

The uses of the air in the arts of life are as numerous as these arts themselves. The air wafts our ships "from Indus to the Pole;" raises water in our pumps; gives motion to various sorts of machinery; enables us to explore the treasures of the deep in the diving-bell, or to soar above the clouds in the balloon. The clouds themselves are supported by the air,—the state of which regulates and determines what we popularly call weather. The various forms of rain, dew, mist, and snow, by which natural scene are so beautifully diversified and improved, depends upon the state of the air, and its relation with respect to heat. The great aërial ocean, therefore, is a source of importance, utility, and beauty, to all animated nature; and we are about to inquire into its properties, but chiefly with reference to an instrument by which the ebbs and floods of this ocean of air are marked. A person well acquainted with all these properties must have made no mean progress in scientific knowledge; but, generally speaking, the use of an instrument so well known, and so extensively employed, as the barometer, is too apt to engender such a degree of forgetfulness of the principles on which it is constructed, or on which it acts, that few persons are aware of the delightful fields of inquiry into which they would be led, in endeavouring to trace, and to account for, the mode of operation, and the physical laws which determine the utility of this, as well as many other mechanical contrivances, which the ingenuity of man has invented for his own service. Yet such inquiries are, perhaps, among the best modes of attaining a knowledge of the principles of science; for, so united are the sciences one with another,—so imperceptibly are the boundaries which separate them shaded off, that a thorough knowledge of the principle of construction, and of operation, of any one instrument, will lead us into more sciences than at first we should be apt to suppose.

[Tomlinson's *Student's Manual of Natural Philosophy.*]

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